Nutrition Views
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NUTRITION PROBLEMS OF COMBAT RATIONS

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Assuring nutritional adequacy of rations in today's global defense preparations is one of the most challenging problems the Institute is attacking. Modern military operations may be conducted in burning deserts, freezing polar regions, high in the earth's stratosphere, or deep below the surface of the sea. The current conception of Armed Forces' feeding is a ration to fit an operational situation, i.e., an operational ration. Packaged rations for operational use by small groups or individuals are designed for situations where kitchen facilities are not normally available.

Rations must meet four military requirements: (a) nutritional adequacy —maximum nourishment compatible with the tactical situation and the absence of any constituent that might cause detrimental physiological effects (abnormal thirst, gastric disturbance); (b) acceptability—inclusion of sufficient variety to make meals acceptable when eaten hot or cold for several days; (c) stability — good keeping quality for two years of storage at temperatures ranging from 65°F. to 130°F. and relative humidities from 10 to 90 percent; (d) utility—saving of weight and space, easy preparation in the field, and capacity to withstand handling in transport and storage. Limitations imposed by these essential requirements of acceptability, stability, and utility are obstacles to the attainment of nutritional adequacy.

In striving to achieve this goal, existing rations are evaluated to determine shortcomings. Data on nutrient content of specially formulated items is obtained by laboratory analysis. To insure reliable data on vitamins, interfering substances which develop during processing and storage are taken into account. The nutritional adequacy of a ration is evaluated physiologically by animal tests. Another responsibility is determining the physiological availability of ration foods after varying periods of storage under known temperatures and humidities.

In modern global operations, military personnel frequently are exposed to various environmental, physiological, and psychological stresses. These may induce changes in metabolism and in food requirements. Understanding the nature and extent of such changes is prerequisite to design of nutritionally adequate rations.

Ration Improvement

Extensive use of processed foods makes the daily supply of adequate nutrients in packaged operational rations a critical problem. Knowledge of vitamin and amino acid losses incurred, and the development of means for preventing or counteracting these losses is essential. Considerable losses of vitamin A, ascorbic acid, and thiamine are known to take place during processing and storage of ration items. Most of the vitamin A in operational rations is derived from plant sources. Due to the poor conversion of carotene into vitamin A by man, greater quantities of animal vitamin A (e.g. dairy products) should be included. To provide recommended daily allowances of vitamins, it is necessary to fortify operational rations.

The nutritional contributions of milk and dairy products are of recognized importance for feeding combat troops. However, many problems must be solved if these products are to be fitted to the complexity of military requirements because of the inherent perishability of all processed milk products.

Fresh milk is without question the favorite food of our soldiers—as a recent Quartermaster attitude survey reveals. If beverage milk is to be included in operational rations, it must be obtained from a dry whole milk which, after storage for six months at 100°F., will reliquefy readily without special equipment and will closely

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simulate fresh milk in acceptability. A dehydrated spread for bread which will not melt at 100°F., and which possesses a storage life of at least six months at 100°F., is needed. It must be consumed without further preparation, or be readily reconstituted and "spreadable" despite temperature extremes, and be comparable in acceptability to a high-scoring butter.

Recently developed by the Institute, with industrial collaboration, is dehydrated, modified, sweetened milk. Readily dispersible in hot coffee, cocoa, or tea, it provides calcium and vitamin A, and improves the palatability of the vitamin C fortified beverages. A cheese bar containing a spray-dried cheese product, nonfat milk solids, additional protein, and shortening has also been developed. High caloric density, high protein content, and high acceptability are the features which make this an especially suitable food for an all-purpose survival ration.

Military nutrition studies are thusly directed toward a description and development of the ideal operational ration—one which will enable military personnel to carry on their activities with the greatest possible efficiency and maximum resistance to disease.

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Glances AT NUTRITION RESEARCH

Obesity and child health and growth are nutrition problems of national public interest as they affect the vitality and usefulness of our adult population today and in the years ahead. Nutrition studies with human subjects continue to reveal complexities and to provide solutions to these problems.

Minerals and Weight Reduction—Calcium and phosphorus may be less efficiently utilized by the body during weight loss. This conclusion was reached in a recent report of a study of the mineral and protein metabolism of twelve young obese women during a period of weight reduction. These young women lost an average of 19.2 pounds during fifty-four days on a controlled 1200-calorie diet which met the Recommended Daily Dietary Allowances for young women for all nutrients except protein and calories. However, the calcium and phosphorus retention of a number of the subjects was not considered adequate. The authors suggest that early control of weight in prevention of obesity is more desirable than later weight reduction.

—J. Am. Diet. Assn. 27:480 (June) 1951.

Food Intakes of Children — Further evidence has been reported that the diets of children below ten years of age are more nutritionally adequate than are the diets of adolescents; and that adolescent boys eat a better diet than do adolescent girls. This was revealed by fall and spring surveys of the food intakes of school children in New York State. Calcium and ascorbic acid were the nutrients which most frequently were low in all diets. No significant seasonal differences in nutrient intakes were observed.

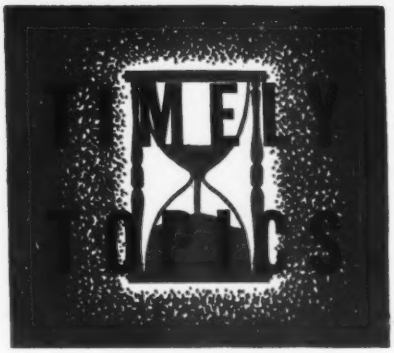
—J. Am. Diet. Assn. 27:289 (April) 1951.

Child Growth and Vitamin B_{12}—Further evidence has been reported that orally administered vitamin B_{12} has a favorable effect on child growth. Twenty-one chronically ill and nine clinically healthy children receiving daily supplements of this vitamin showed greater weight gain than did comparable children receiving similar diets and treatment during the same periods. For instance, ten malnourished children receiving vitamin B_{12} daily gained 89.3 ounces in three months time while eleven malnourished children, without this supplement, gained only 45.1 ounces. This difference of 44.2 ounces in weight gain in three months time was statistically highly significant. No estimate was made of the minimum amount of vitamin B_{12} which might be necessary to promote this weight gain.

—J. Nutrition 43:323 (Feb.) 1951.

Vitamin B_{12} Content of Milk — The vitamin B_{12} content of the milk of eight species has been reported. The average content of cows' milk was higher than that of the other species studied and did not appear to be significantly altered by pasteurization. Commercially pasteurized cows' milk contained an average of 4 micrograms of vitamin B_{12} per liter.

—J. Nutrition 43:313 (Feb.) 1951.



As Chief of the Nutrition Division, Quartermaster Food and Container Institute for the Armed Forces, Dr. Harry Spector organized the present research program on nutrition. He received his Ph.D. from the University of Wisconsin. Formerly he was a member of the graduate faculty at the University of Illinois in the Division of Animal Nutrition, where his principal research interests were in the fields of vitamins and amino acids.

1951 marks two centennials in the dairy industry. In Oneida County, New York, Jesse Williams established the first factory system of cheese manufacture in 1851. Also in 1851, Jacob Fussell started the first ice cream plant in Baltimore. Rapid growth through industrial science has marked both industries and made high quality, sanitary cheese and ice cream everyday foods in our national dietary. Local and national celebrations mark these centennials of progress.

By the end of 1950, school lunch programs were in operation in 48 states and 4 territories, serving over 8½ million children. An estimated 1437 million school lunches were served in 1950-51. About two-thirds of these were type A, planned with milk to provide one-third or more of the average child's nutritive requirements for one day.

AN APPROACH TO TEACHING GOOD NUTRITION

By Ethel Maslansky, Nutritionist, Bureau of Nutrition
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The art of interpreting the science of nutrition to the man in the street to effect a permanent change in his eating habits has not kept pace with laboratory research. To minimize the lag, we must know as much about how to teach as we know about what to teach.

In a study conducted by the Nutrition Clinic of the New York City Department of Health, an opportunity was presented to explore the nature and variety of eating problems of a group of underweight children, and ways of dealing with these problems. Developing methods and techniques in nutrition education is an essential aspect of the objectives of the Bureau of Nutrition.

In the study of the individual growth and development patterns of 125 underweight children (7 to 9 years) referred by the school physician, the nutrition and medical activities were integrated. The latter included periodic medical examination, anthropometric measurements, blood chemistries, and psychometric tests.

It was a unique opportunity to work with the same children for several years. It seemed appropriate that the nutritionist who had social work training should consider her problem not just that of determining dietary status and offering diet correction, but should try to include some understanding of the child as a whole.

Successful teaching of nutrition depends on working on the assumption that the eating pattern of an individual is influenced by environmental, psychological, socio-economic, and perhaps other factors.

The eating problem of each child was carefully drawn. Periodic diet histories were taken; the child's likes and dislikes, attitude toward eating, and the onset of his eating difficulties were noted.

Although most of the families had marginal or sub-marginal incomes, the managerial ability of the mother varied greatly. A blanket statement about the influence of the economic factor on eating problems cannot be made, but appears in individual cases.

Cultural factors are related to the food patterns of a child, but assimilation and integration with community food customs is taking place. The father born in Italy enjoys the tangy flavor and texture of escarole and chicory; his American-born child prefers lettuce and raw carrots or perhaps some of our less valuable foods.

The mother's attitude toward her child's physical status is an important consideration. Does she want him to be thin because his father is thin, and "he is just like his father," or does she want him to be "chubby" so that friends and relatives will know how well she feeds him? Does she leave him to his own devices in relation to his eating habits, or is she rigid and coercive and in constant search for food that will magically change her underweight child to a husky boy?

The feelings of the mothers ranged from seeming acceptance of the child's physical status to great anxiety and a sense of failure. Effective teaching has to be directed toward one or the other of these attitudes. It was most important to give the mother a sense of participation in the problem; she and the clinic personnel working together on a common objective, achieving a common goal.

In the child's own world of school and home, his appetite may be temporarily impaired by an unhappy experience at school; or seriously impaired if he is constantly denied by his mother the right to say, at times, "I am not hungry this morning" or, "I don't feel like eating spinach tonight."

The detailed methods of approch and findings of this study will appear in a full report. (See page 4.) The most important lesson learned was that an understanding of the individual, and the nature and variety of his dietary problem is essential for more effective nutrition education.

COLLEGE STUDENTS' HEALTH HABITS

By Anne S. Loop, Ph.D., Assistant Professor and Anne B. Tipton, M.A., Instructor of Physiology, Health and Hygiene, Hunter College of the City of New York

Dr. Loop

This study was made to learn the health status, attitudes, and practices of freshmen at Hunter College. With this information, health instruction could be made more meaningful, and pointed more effectively toward the needs of the young women.

The statistical material was collected from entering freshman classes registered for the required personal hygiene course, 1948-1950. Representing a cross-section of the freshman, 1033 students were questioned. The inventory method was employed; questionnaires were answered anonymously. The four main divisions were: personal appearance and body grooming; daily health habits including food habits; mental and emotional health; and physical status.

Personal appearance and body grooming is an important and tangible goal at college level. Interest is high and an effective motivation for health study. Findings were satisfactory except for ocular weaknesses and dental caries. Only half the group reported normal vision. Even though almost 90% reported brushing their teeth daily, most of them twice, and 90% visited the dentist every six months or yearly, more than one-third had teeth which needed attention. While one-third of the girls were overweight, most of them were within a ten pound variable. Only 6% were underweight.

Daily health habits were studied as related to nutrition, exercise, recreation, and studies. In the nutrition area, qualitative information was sought on specific daily dietary inclusions. The overall average in food selection as rated on a U.S.D.A. score card was 83%, which is a "fair to good" nutritional score; 79% of the students reported regularity of all meals.

Meat or fish was chosen daily by the greatest number of students, 98%. Dairy products (butter, cream, or cheese) came next in order of popularity, with 94%. Vegetables of various kinds were above the 90% level, as were citrus fruits, but only 78% included at least one additional fruit. Three or more eggs per week were eaten by 78% of the students. The two outstanding weaknesses were in

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—that the annual production of butter in the United States has more food-energy value for human beings than the mechanical energy which Hoover Dam generates in a year?

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—that an estimated 25 to 30 percent of the adult population in the United States is overweight? The percentage may be as high as 60 percent among women who are 50 to 70 years old.

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—that in the United States we manufacture about 21 times more cheese than we import; 20 years ago, we made less than 10 times our imports?

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—that the West Indian cherry may turn out to be the richest natural source of vitamin C known?

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—that United States milk production per cow reached an all-time high of 5292 pounds in 1950?

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—that oranges are the most popular of fresh fruits eaten in the city, followed by bananas and apples?

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—that in 1950 four million gallons of ice cream were sold through vending machines?

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—that the United States only ranks fourth in per capita calorie consumption, fifth in animal protein consumption, and seventh in total protein consumption?

THINGS YOU'LL LIKE TO READ

Eating Problems of Children—A Guide for Parents, and Eating Patterns of Children — A Guide for Doctors and Nurses — New York: The National Association for Mental Health, Inc. 1951. 15 cents each. Quantity rates.

These 20-page pamphlets on eating problems have been prepared by Nina Ridenour, Ph.D. The first gives down-to-earth advice to mothers for handling children's eating problems. It is specific and easy-to-read; gives a relaxed common sense view. The companion piece gives those working with mothers a background and understanding of the mental health aspects of children's eating habits.

Essentials of Nutrition—Henry C. Sherman and Caroline S. Lanford. 3rd Ed. New York: The Macmillan Co. 1951. $4.25.

New edition of a popular nutrition textbook, brought up to date by incorporating the most recent advances in nutrition. General character and scope are like previous edition, but each chapter has been carefully revised.

School Lunch Management in Relation to Nutritive Value, Cost, and Acceptance of Foods Served. PA-114. Washington, D.C.: Bureau of Human Nutrition and Home Economics, Agricultural Research Administration, U. S. D. A. 1951.

Report of studies of school lunch management: to observe and evaluate management methods in selected school lunch programs; to relate nutritive value, cost, and acceptance of lunches served; to develop a suitable technique by which school lunch supervisors and others can make management appraisals of local school lunch programs.

Emotional and Environmental Factors that Affect Nutrition of Children — (Maslansky article, page 3.)

A complete report on this survey, as well as articles for professional journals, on different aspects of this study, are now in preparation. References will appear in this column as they are available.

COLLEGE STUDENTS' HEALTH HABITS

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milk and whole-grain cereals. Only 74% of the girls consumed at least three glasses of milk a day. Less than half ate whole-grain cereals.

In the light of the findings, renewed effort should be made to increase the whole-grain cereal foods in the student dietaries, and effectively present the inclusion of a desirable amount of milk as the most highly protective food of the entire dietary. The freshman group is still growing and should have an added safety factor over a minimal amount of milk. Milk and whole-grain cereals lend themselves so readily to the breakfast meal that the practice of eating "better breakfast for top efficiency" could be profitably correlated here. Inclusion of more eggs also should be encouraged as a source of iron. The data also revealed need for increasing the amount of regular exercise and the hours of sleep allotted.

The mental and emotional health data was interesting in the light of present-day emphasis on this heretofore neglected area of the "entire" individual. Hunter freshmen seem generally well-integrated. However, individual personality weaknesses were revealed; tendency to worry, to be over-sensitive, to rationalize, and to waste time and energy dominated.

The physical status data indicated a good level of over-all physical health. Close to one-half reported the absence of any defects or health problems. Eye disorders (43%) far exceeded all other defects listed. The other predominant findings show about 13% of the girls were anemic and 11% suffered from chronic sore throat. The incidence of colds was high, 66% reported one to two colds per year.

In summary, this study has brought more clearly into focus the health status of Hunter College freshmen. The study, together with the resulting recommendations, may provide a starting point for a more effective college hygiene program through greater enrichment, further expansion, and better channeling of efforts.